COURSE SYLLABUS 2022-23

BASIC INFORMATION ON THE COURSE

Course:	Multimedia Technologies		
Course code:	40154321	Plan:	Grado en Ingeniería Informática (Plan 2015)
Academic Year:	2021-22	Undergraduate/Graduate:	Undergraduate
Degree Year:	4	Type:	Optative
Duration:	First semester		

TIME DISTRIBUTION ACCORDING TO REGULATIONS

Credits:	6
Total time:	150
USE OF LEARNING PLATFORM (Teaching support, Multimodal, or Virtual):	Teaching support

TEACHERS

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OTHER IMPORTANT INFORMATION

Content Justification

The treatment, transmission and storage of multimedia content (especially audio and video) are frequent processes in human-machine and machine-machine interaction systems. The subject of Multimedia Technologies (MT) addresses the most fundamental aspects of these multimedia systems that, in turn, are part of other information systems.

Courses Related in Study Plan

* Servicios en las Tecnologías de la Información (Tecnologías Web y Tecnologías Multimedia). * Tecnologías de comunicación y seguridad (Transmisión de Datos y Redes de Computadores, y Seguridad Informática). * Teoría de códigos y criptografía (Teoría de Códigos y Criptografía). * Sistemas operativos, Sistemas distribuidos y redes y arquitectura de computadores (Sistemas Operativos, Fundamentos de Redes de Computadores, y Arquitectura de Computadores). * Tecnologías de acceso a la información (Periféricos e Interfaces, Tecnologías de Acceso a Red).

Required Knowledge to Address the Course

1. Computer networks.
2. Computer programming.

Pre-Required Knowledge

None.

COMPETENCES

Basic and General Competences

Basic competences

RD2: Application of knowledge. Students should be able to apply acquired knowledge and problem solving skills in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study.

General competences

Key competences University of Almeria

UAL3: Ability to solve problems

Specific Competences

TI1: Ability to understand the environment of an organization and its needs in the field of information technologies and communications, in real time.

TI6: Ability to conceive systems, applications and services based on network technologies, including Internet, web, e-commerce, multimedia, interactive services and mobile computing.

LEARNING OUTCOMES

1. To master the processes of digitization and capture of audio and video.
2. To know the main storage and streaming formats for multimedia content.

PLANNING

Contents

1. Introduction to the framerwork.
    a. Linux.
    b. Git.
    c. Python.
2. Audio sampling and transmission over the Internet.
    a. The Human Auditory System and the sound.
    b. Real-time audio transmission using UDP.
3. Latency control.
    a. Characterization of the latency of the transmission link.
    b. Buffering techniques.
4. Bit-rate control.
    a. Entropy coding.
    b. Quantization.
    c. Characterization of the capacity of the transmission link.
5. Transform coding.
    a. Inter-channel decorrelation.
    b. Intra-channel decorrelation.
6. Perceptual coding.
    a. The threshold of hearing
    b. Simultaneous masking.

Learning System and Methodology / Contingency Plan

Learning Methodology

1. Participatory master classes.
2. Preparation and writing of practical works.
3. Autonomous or group work.

MT is taught following the PBL (Project Based Learning) methodology. Students, by development groups of up to 4 people, implement a project related to the contents of the subject, by specified and timed milestones in the Study Guide. The face-to-face sessions are dedicated to:

1. Develop the agenda and resolve doubts about its contents.
2. Develop the projects.
3. Present and evaluate milestone solutions.

Learning system

1. Participatory master classes.
2. Preparation and writing of practical works.
3. Autonomous work. 25% of the teaching group sessions are dedicated to this activity.
4. Presentation of works / projects.

Contingency plan

Given high levels of health alert, the training activities planned in the Teaching Groups will be taught through videoconference. The Working Groups will continue with face-to-face teaching according to the planning established. In the face of more restrictive measures agreed by the health authorities, the Working Groups would also be held by videoconference".

Teaching Innovation Activities

This subject participates in the groups of teaching innovation "Development of Resources to motivate the study of Computer Engineering" and "Integration of the CISCO NetAcad curriculum as a teaching complement IV". Activities related to the development of the subject project are carried out.

Functional Diversity / Functional Disability

Those students with disabilities or special educational needs can get in contact with the Delegation of the Rector for the Functional Diversity (http://www.ual.es/discapacidad) to receive the appropriate guidance and advice in order to facilitate their instructional, learning and training processes. Likewise, these students may request the implementation of the necessary and suitable adaptations of content, methodology and evaluation that guarantee equal opportunities in their academic development. The processing of any personal data or aggregated information regarding these aforementioned students, in fully compliance with the GDPR, is strictly confidential. Faculties and academic staff lecturing the course referenced by this guide/document will be in charge of applying the recommended adaptations approved by the Delegation of the Rector for the Functional Diversity. This fact will be, therefore, notified to the School or Faculty as well as to the coordinator of the academic course.

COMPETENCY ASSESSMENT

Criteria and Assessment Tools / Contingency Plan

Criteria and Assessment Tools

MT is evaluated continuously, although there is the possibility of a single final evaluation, which would be carried out on the day scheduled for the exam. The continuous evaluation of the students is carried out from the work developed for each of the milestones that are periodically presented in class. The qualification for each milestone is carried out by both the students and the teacher and is calculated from a specific rubric for the corresponding milestone that takes into account the skills that the student must acquire:

1. Knowledge application (RD2): Students face the projects based on the knowledge acquired during the teaching group classes (master classes) and the work group (practical classes), which helps to solve the different problems that arise during the realization of the project. However, this feedback from teachers only helps to guide students. It is they who during the development of the project need to apply the knowledge to carry out the assigned project.

2. Ability to solve problems (UAL3): During the realization of the guided project, students must face different problems that arise naturally during the development of any real project. Since the completion

of the project is highly dependent on the resolution of these problems, the ABP and the final evaluation of the project is a good way to quantify the problem solving capacity.

3. Ability to understand the environment of an organization and its needs in the field of information and communication technologies (IT1): The project addressed in the subject is a real project, which is generally framed in other broader contexts (continuation of previous projects, socially interesting projects, etc.). Therefore, students need to have a good understanding of project requirements. In addition, since all students are regularly followed up face-to-face through the milestone presentations and a brainstorming session is held, all students show (in this case mainly in a spoken way) their ability to contribute ideas or indicate weaknesses / strengths of their development and those of their peers. Also indicate that different tools are used (Virtual Campus, GitHub) that facilitate interaction between students and the teacher (s), and that help to quantify the ability of students to understand the technological needs of their environment.

4. Ability to conceive systems, applications and services based on network technologies, including Internet, web, electronic commerce, multimedia, interactive services and mobile computing (IT6): TM covers aspects related (mainly) to systems, applications and services multimedia. Therefore, all projects have this factor in common. Since the successful development of projects depends directly on the students' ability to carry them out, this competence is evaluated by quantifying the number and quality of objectives (milestones) achieved, which on the other hand are in most cases defined by the students during the process of defining objectives to carry out in their projects.

The grade for the course is the average grade for all milestones. In the case of doing only the final single evaluation (only for students who meet the requirements) or the extraordinary call (all students), the grade for the subject would be the one achieved in said evaluation. In this exam, the same knowledge that should be acquired by completing the milestones will be required.

Contingency Plan

What is indicated in the evaluation section will be maintained. In cases in which the health authorities advise and/or agree not to presence of the evaluation tests in the ordinary and/or extraordinary calls, the Indicated tests will be carried out through the virtual platform.

Follow-Up Mechanisms

1. Tutoring.
2. Delivery of activities en Aula Virtual.
3. Delivery of activities in class.

COURSE MATERIALS

Recommended Course Materials

Basic

- *Khalid Sayood. Introduction to data compression. Morgan Kaufmann, 2017.*
- *Richard Mayer. Multimedia Learning. Cambridge University Press, 2020.*
- *Michaela van der Schaar and Philip A. Chou. Multimedia over IP and Wireless Networks: Compression, Networking, and Systems. Elsevier. 2011.*

- *K.R. Rao, J.J. Hwang. Techniques and standards for image, video, and audio coding. Prentice Hall. 1996.*
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Complementary

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Other materials

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Couse Materials Available in UAL's library

You can view the current bibliography in the Library Management System by consulting the following address: https://www.ual.es/bibliografia_recomendada40154321

WEBSITES

- https://tecnologias-multimedia.github.io